

Microsoft®  
**SQL Server™ 2005**

**DAT200**

Microsoft®  
**SQL Server™ 2005**

# **A 'Whistle Stop' Tour Of SQL Server 2005 (Codenamed "Yukon")**

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# Agenda

- **SQL Server 2000 Update**
- **SQL Server 2005 - The Data Platform**
- **SQL Server 2005 - New Scenarios**
- **Business Intelligence & Management**



# SQL Server

## Summary of release activities

- Web Services Toolkit  
✓ Launched February 14th, 2002
- SQL BI Accelerator  
✓ Launched May 9th, 2002
- SQL Notification Services  
✓ Launched August 26th, 2002
- SQL Server CE 2.0 v2  
✓ Launched September 16th, 2002
- SQL Server 2000 Service Pack 3  
✓ Launched January 17th, 2003
- SQL Server 64 bit  
✓ Launched April 24, 2003
- SQL Server Reporting Services  
✓ Launched January 27<sup>th</sup> 2004



Microsoft  
**SQL Server** 2000  
Web Services Toolkit

Microsoft  
**SQL Server**  
Notification Services

Microsoft  
**SQL Server** 2000  
Reporting Services

# Terabyte and Beyond

Microsoft®  
**SQL Server™ 2000**



Lucent Technologies  
Bell Labs Innovations



**COMMANDER®**



Scottish and Southern Energy plc



**5TB and 33B rows in single app;  
15TB total**

**3TB network schema mapping app**

**3 TB telephony application; 12B  
rows**

**1.7TB Internet auction app**

**1.6TB data warehouse**

**1.3TB data warehouse**

**1.3TB data warehouse retail  
application**

**1TB data warehouse retail  
application**

**1 TB customer credit data app, 16 TB  
total**

# SQL Server Scalability

<i>Number of Rows - OLTP - All</i>					
<i>Rank</i>	<i>Organization</i>	<i>Number of Rows (Millions)</i>	<i>Database Vendor</i>	<i>Server Vendor</i>	<i>Storage Vendor</i>
1	UPS	41,985	IBM Computer	IBM	EMC
2	Caixa Econômica Federal	34,151	Associates	IBM	EMC
3	Verizon Communications	33,341	Microsoft	HP	EMC
4	Commander Communications Ltd	17,033	Microsoft Computer	Dell	Dell
5	Bureau of Customs & Border Protection	16,663	Associates	IBM	Hitachi
6	GevityHR, Inc.	12,703	Oracle Computer	HP	HP
7	BT plc	11,897	Associates	IBM	EMC
8	American Electric Power	10,310	IBM	IBM	EMC
9	Verizon Communications	9,157	Microsoft	HP	EMC
10	Turkcell Iletisim Hizmetleri A.S.	8,146	Oracle	Sun	EMC

Source: Winter Corporation 2003 Winter TopTen™

[http://www.wintercorp.com/vldb/2003\\_TopTen\\_Survey/TopTenWinners.asp](http://www.wintercorp.com/vldb/2003_TopTen_Survey/TopTenWinners.asp)



# SQL Best Practices

## Analyzer

Scans SQL Server installations for  
“Best Practices”

- T-SQL (procs, functions, views, triggers)
- Configuration
- Deprecation
- SQL Server 2005 Readiness
- Consolidation of “Best Practice” lists
- Avoid common mistakes
- “Read Only” tool
- Works with SQL Server 2000
- RTM at Tech Ed  
(<http://www.microsoft.com/SQL>)

# demo

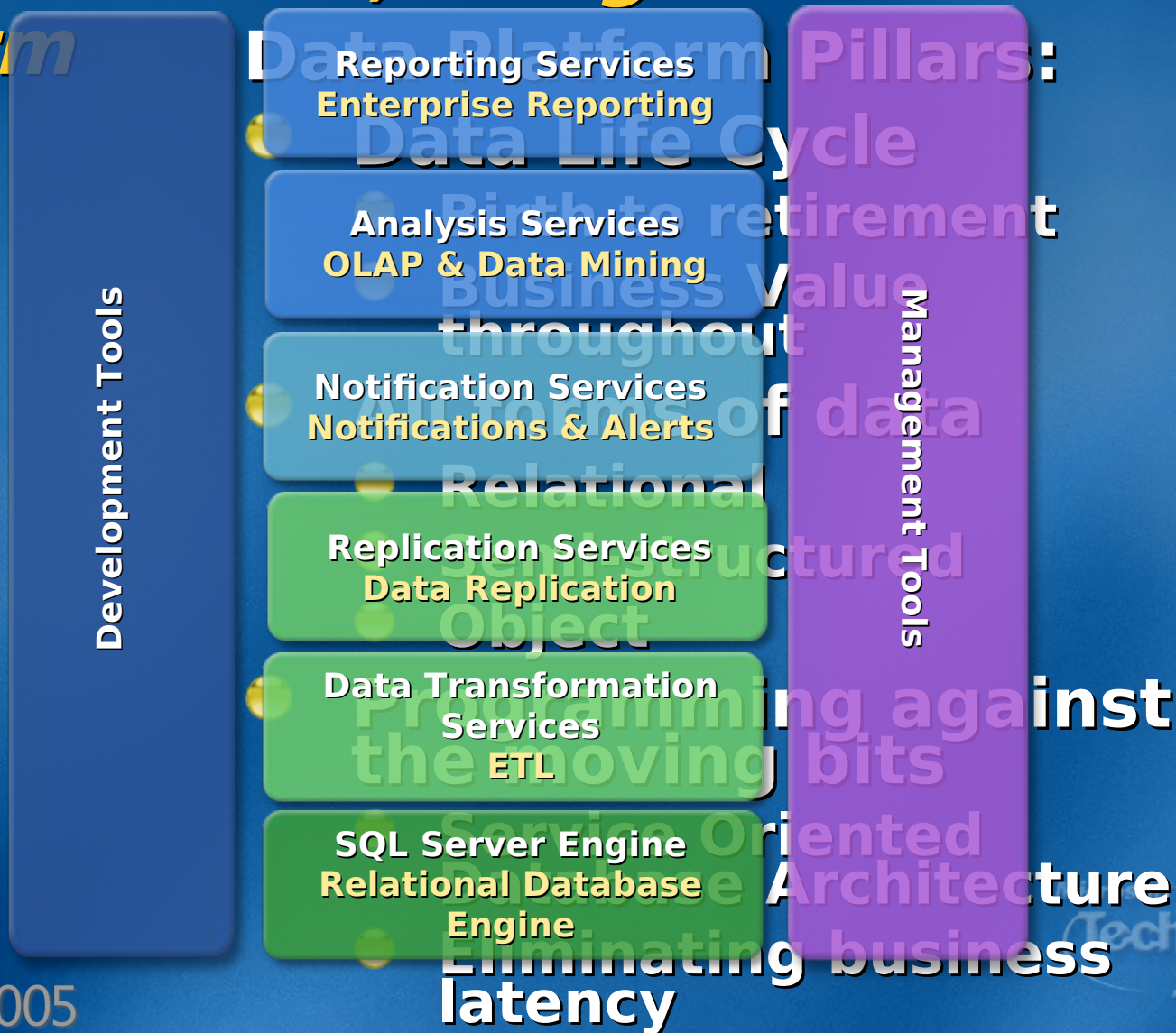
## Best Practice Analyzer

**Tom Rizzo**  
**Director, SQL Server**  
**[thomriz@microsoft.com](mailto:thomriz@microsoft.com)**



# SQL Server

## *Comprehensive, Integrated Data Platform*



# Our value proposition

**Absolute Leadership in total system lifecycle cost**

- **Lowest cost of acquisition**
  - Incredible value “In the box”
    - RDBMS, Replication, Device support, ETL, BI, Reporting, Management, ...
  - No expensive add-ons!
- **Lowest cost of development**
  - World’s best tools
  - Integrated debugging
- **Lowest cost of deployment**
  - Integrated management
  - Self managing systems



# Scalable, Secure, Enterprise-Class Data Management Platform For Windows Server System

## Microsoft® SQL Server™ 2005

### Developer Productivity

- .NET Framework hosting
- Native XML technology
- Integrated web services
- Distributed application framework

### Business Intelligence

- Comprehensive ETL platform
- Real time analytics
- Accessible, easy data mining
- Rich, integrated reporting

### Enterprise Data ManagementSecure, Quality Database

- Flexible, manageable, scalable
- Improved serviceability
- Self optimization and tuning
- Fast recovery and restore
- 3 years in development
- Many new security features
- Secure by default
- Large private beta for early quality



## NET Framework

- Common Language Runtime Integration
- User-defined Aggregates
- User-defined Data Types
- User-defined Functions
- SQL Server .NET Data Provider
- Extended Triggers

## Data Types

- Managed SQL Types
- New XML Datatype
- Varchar (MAX) Varbinary (MAX)

## SQL Server Engine

- New Message Service Broker
- HTTP Support (Native HTTP)
- Database Tuning Advisor
- Multiple Active Result Sets
- Persisted Computed Columns
- Snapshot Isolation Level
- Scale Up Partitioning
- VIA support
- NUMA support

## Database Failure and Redundancy

- Fail-over Clustering (up to 8 node)
- Enhanced Multi-instance Support
- Database Mirroring
- Database Snapshots

## XML

- XQUERY Support
- XML Data Manipulation Language
- FOR XML Enhancements
- XML Schema (XSD) Support
- MSXML 6.0 (Native)
- .Net XML Framework

## Full-text Search

Microsoft® Indexing of XML Datatype

## Database Maintenance

- Backup and Restore Enhancements
- Checksum Integrity Checks
- Dedicated Administrator Connection
- Dynamic AWE
- Fast Recovery
- Highly-available Upgrade
- Online Index Operations
- Online Restore
- Parallel DBCC
- Parallel Index Operations

## Management Tools

- New Management Studio
- MDX Query Editor
- Version Control Support
- XML/A
- SQLCMD Command Line Tool

## Performance Tuning

- Profiler Enhancements
- Profiling Analysis Services
- Exportable Showplan
- Exportable Deadlock Traces

## MDAC

- SNAC
- Microsoft Installer base setup
- Support for Active Directory Deployment

## SQL Client .NET Data Provider

- Server Cursor Support
- Asynch

## Security

- All Permissions Grantable
- Fine Grain Administration Rights
- Separation of Users and Schema
- Data encryption primitives

## Replication

- Auto-tuning Replication Agents
- Oracle Publication
- Improved Blob Change Tracking
- Replication Monitor

## OLAP and Data Mining

- Analysis Management Objects
- Windows Integrated Backup and Restore
- Web Service/XML for Analysis
- DTS and DM Integration
- New Data Mining Algorithms
- Auto Packaging and Deployment

## Data Transformation Services

- New Architecture (DTR + DTP)
- Complex Control Flows
- Control Flow Debugging
- For Each Enumerations
- Property Mappings
- Full Data Flow Designer
- Full DTS Control Flow Designer
- Graphical Presentation of Pkg Execution
- Immediate Mode and Project Mode
- Package (Advanced) Deployment Tools
- Custom Tasks and Transformations

## Reporting Services

- Multiple Output Formats
- Parameters (Static, Dynamic, Hierarchical)
- Bulk Delivery of Personalized Content
- Support Multiple Data Sources
- STS (Web Parts, Doc Libraries)
- Visual Design Tool
- Charting, Sorting, Filtering, Drill-Through
- Scheduling, Caching

# Several New Scenarios

- **Enterprise Data Management**

- How not to be afraid of your pager if you have a 10+ TB database
- Sleep soundly knowing your private bits are secure

- **Developer Productivity**

- Extending SQL Server with several lines of C# code

- **Scale out services**

- Service Broker for asynchronous decoupled services



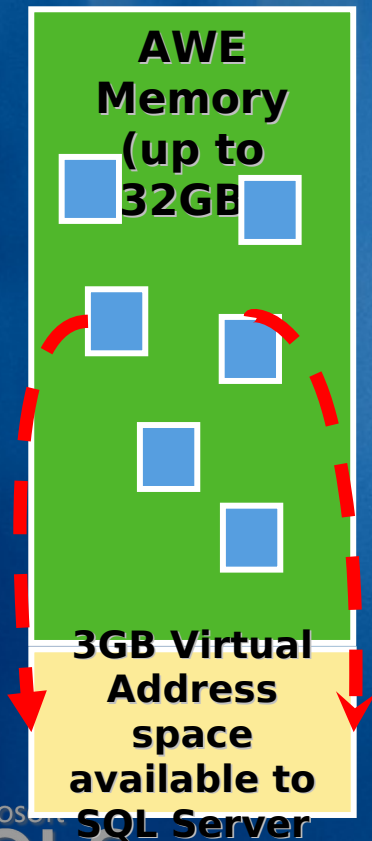
# 10 Terror Bytes?

- **Requirements**
  - 10+ Terabytes
  - Compliance requirements for 10 years of data
  - Concurrent loading, indexing, updating, analysis and reporting
  - Geographic Redundancy with <15 sec failover
- **Reality**
  - Disks go up in smoke
  - Sometimes people press the wrong button
  - I need to see what's *really* going on!



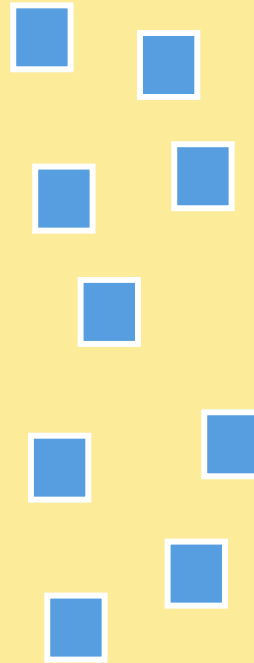
# How about a TB of RAM?

SQL Server 32bit  
running on a Xeon  
Server



- Buffer pool pages can be mapped / unmapped
- As pages are needed, they can be mapped into the virtual address space
- Some structure stay in virtual address memory including plan cache, cursor structures and user connection context
- Cost

Virtual  
Address  
Space  
(currently  
tested up  
to 1 TB)



SQL Server running on

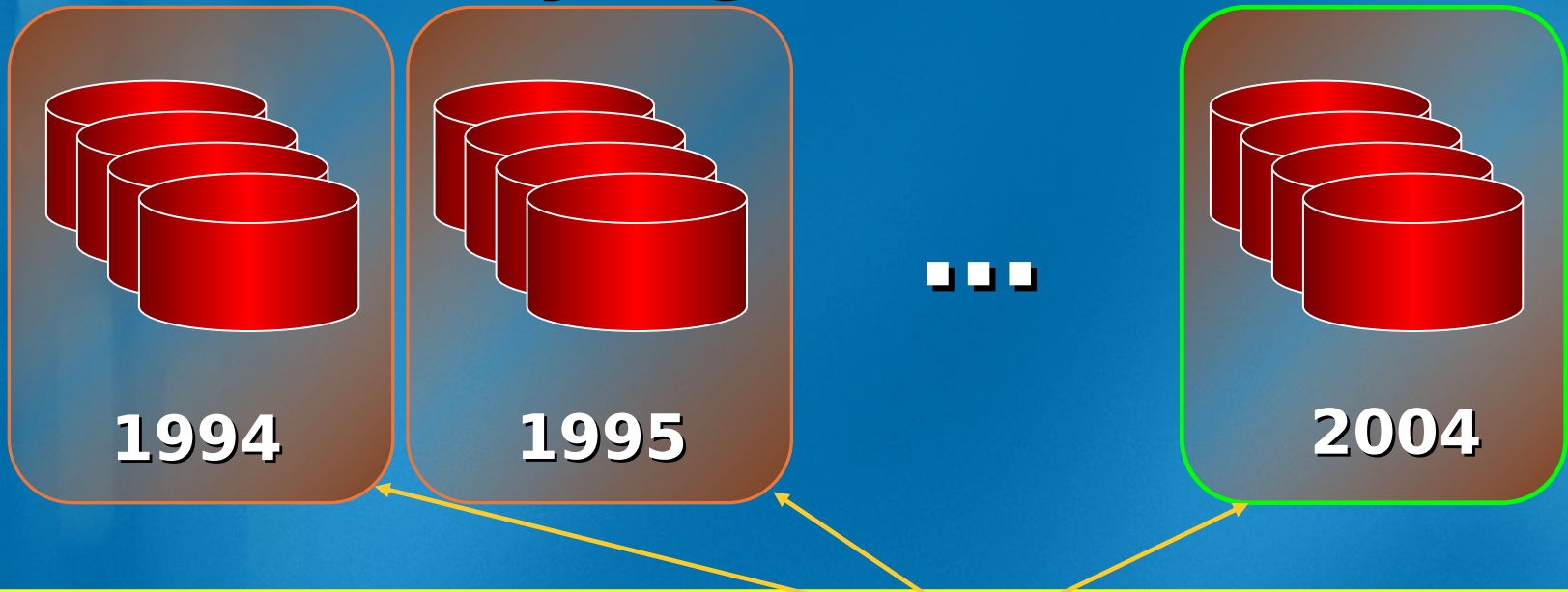
**Native 64 bit**

- Virtual address space available to all structures
- 1TB support in W2K3 SP1
- Direct access – no map cost
- Access to large amounts of physical memory in virtual address space
- Current and future hardware



# 10's of Terabytes - one DB?

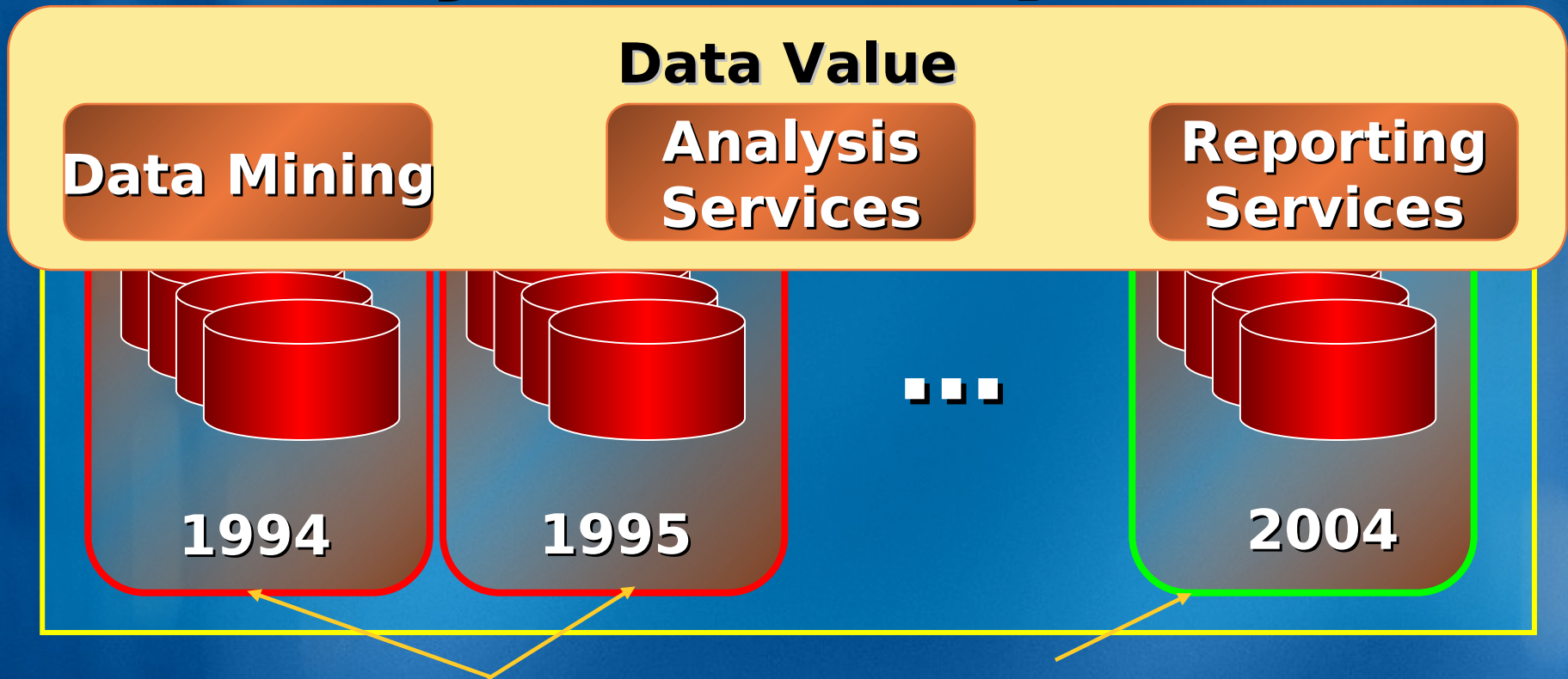
## MyBigDatabase



- It's a single database
- Manage partitions separately
  - Online/Offline - ReadOnly/ReadWrite
- Restore (online!)

Partitions

# History for compliance



**Read/Only Partition    Read/Write Partition**

**Current data on high performance redundant storage**

**Historical data on cheaper storage**

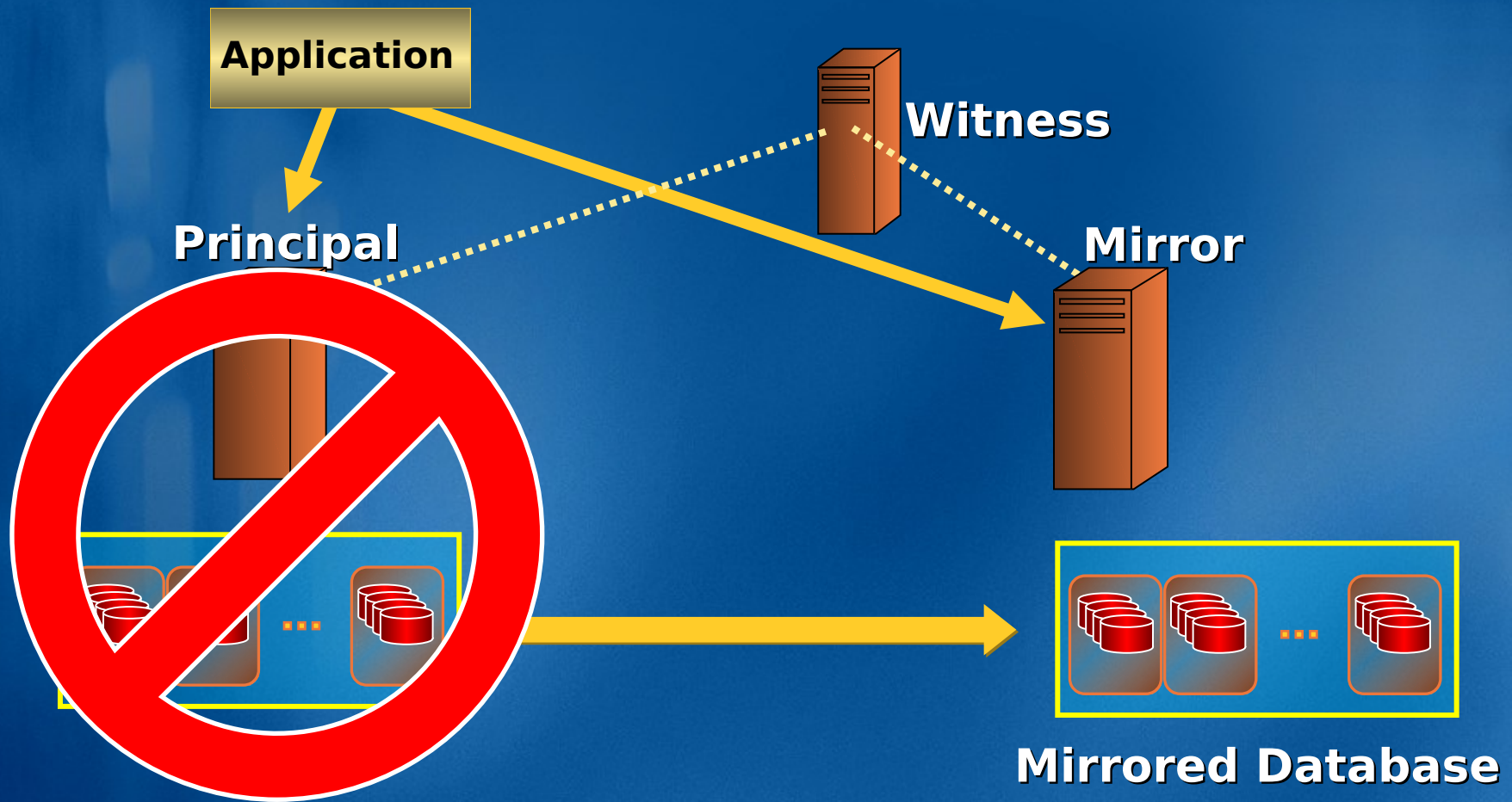
**Partial backups**



# Loading/Indexing/ Querying

- Load, cleanse, index a new table
- Introduce table to partition set
- Indexing
  - Create, Rebuild, Reorganize, Drop, Add or drop constraint - online...
  - Fully parallel
  - Online/offline are both supported
- Querying and reporting w/ Snapshot Isolation
  - “Consistent Read”
  - “Readers don’t block writers”
  - “Writers don’t block readers”

# Geographic Redundancy



- **Mirror Site can be far away**
- **... or on the same floor**

# Database Mirroring

- **Database Failover**
  - **Very Fast ... Seconds**
  - **Automatic or manual failover**
  - **Configurable: Safety Vs Performance**
- **Automatic, transparent client redirect**
- **Database Snapshots for Reporting**
- **Hardware**
  - **Works with standard computers and storage**



# When disks turn on you...



- **Online Restore**
  - Restore 1994 partition
  - Don't need to apply log (read only)
  - Rest of database is online and available!
  - Can even restore single corrupt

# Uh oh...

- If only I could go back in time...
- Database Snapshots!
  - Created instantly
  - Read only
  - Does **not** require a complete copy of the data
    - Shares unchanged pages of the database
    - Requires extra storage only for changed pages
    - Uses a “copy-on-write” mechanism
  - Recover from User, Application or DBA error
  - Rewind database to snapshot

# Server Transparency

**Something's wrong but  
you can't log in:**

- **Dedicated Admin Connection**
  - Access to Server when regular connections fail
- **Can't see in:**
  - **Dynamic Management Views**
    - Server Transparency
    - “sys.memory\_clerks” - how much memory is each component consuming ?
    - “sys.schedulers” - Is a scheduler hung



# **Sleep soundly and securely**

## **Authentication Enhancements**

- **Password policy enforcements for SQL logins**
  - Password complexity, expiration and lockout
- **Strengthening SQL Authentication**
  - Login credentials are always transferred in a secure channel, by default

## ● **Privacy and Encryption**

- Built-ins for Encryption and Decryption of data
- Infrastructure for Key management

## **Off-By-Default**

# demo

## Security Enhancements

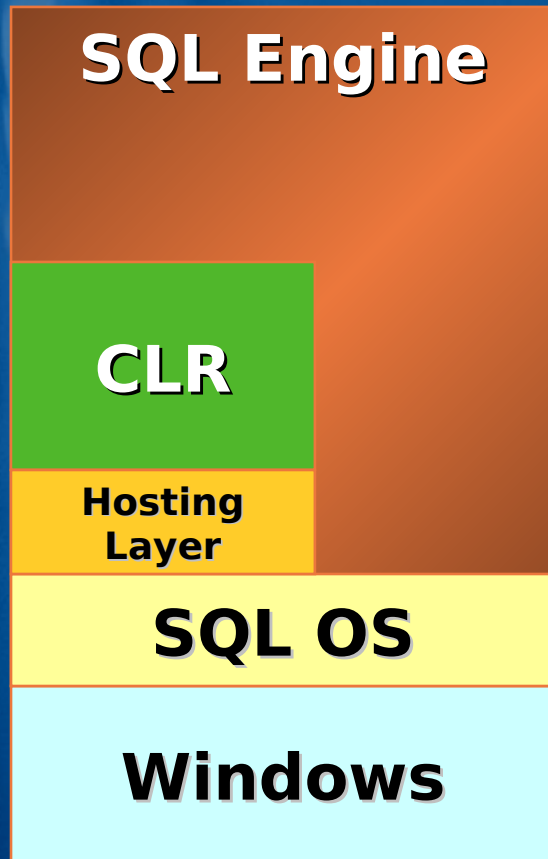
**Tom Rizzo**  
**Director, SQL Server**  
**[thomriz@microsoft.com](mailto:thomriz@microsoft.com)**

# Developer Productivity

- **Goals : World's best database development environment**
- **Important Feature Areas**
  - **CLR Integration**
  - **Database projects, debugging**
  - **Native XML Storage, Query**
  - **T-SQL Enhancements**
  - **Service Broker**
  - **Query Notifications**



# CLR Integration



- **CLR Deeply Integrated**
- **Hosting layer provides coordination of:**
  - **Threads**
  - **Memory**
  - **Garbage Collection**
- **Allows System Extension**
  - **Scalar Functions**
  - **Table Value Functions**
  - **Types**
  - **Aggregates**
  - **Procedures**
  - **Data Access**

# VS Integration

- **Visual Studio supports a new SQL Server 2005**

## **Project system**

- **Easy to develop, debug and deploy .NET code for the database**
- **Integrated debugging experience across mid-tier and database tier**
  - **Seamlessly step cross-language - TSQL and .NET**
  - **Set breakpoints anywhere, inspect anything**

- **Customer benefit : Increased Productivity**

# Native XML Storage

- **Native XML Datatype**
  - Columns, Variables, Parameters
- **XML Schema (optional)**
  - Schema Collections
- **XML Indexes**
- **XML Data access, updates**
  - XQuery
  - DML Extensions
  - Integrates with Relational processing
- **Complements SQLXML**
- **New scenarios: Document management, augmenting relational applications**

DAT319: XML in the Database - the XML Data Type in SQL Server 2005



# T-SQL Enhancements

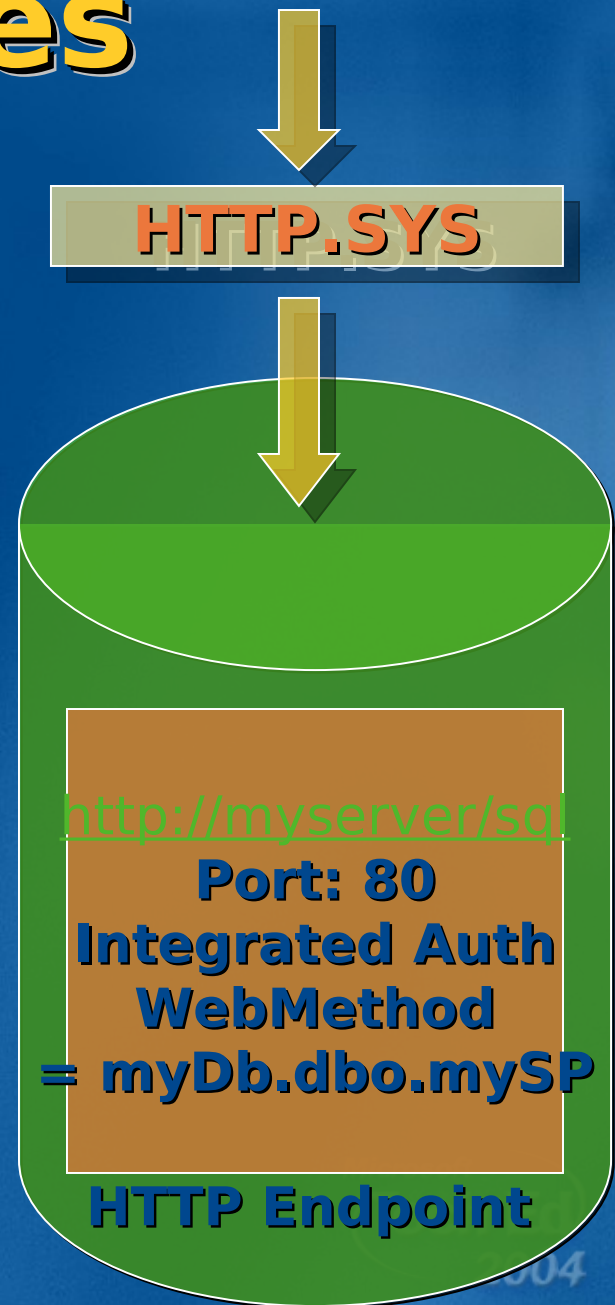
- **Varchar(max), Varbinary(max)**
  - Alternative to Text, Image
  - Uniform Programming model
- **Exception Handling**
  - Try/Catch
- **Recursive Queries**
- **MARS**
- **Other**
  - Pivot, UnPivot
  - Top (expression)
- **Customer usage, benefit : Better database applications, addresses existing pain points.**

# SODA Features

- **SQL Server 2005 implements Service Oriented Database Architecture (SODA) and Scale Out Services**
  - **Web Services access to SQL Server (HTTP)**
  - **Service Broker - Service Based, decoupled, asynchronous, distributed environment**
  - **Query Notifications - Develop responsive multi-tier data backed caches**

# SQL Web Services

- **Native SOAP access**
  - Standards based access to SQL Server
  - No client dependency
  - Improved Interoperability
- **New “HTTP ENDPOINT” object**
  - Configure connection info
  - Configure authentication
  - Expose Functions & SPs
  - Expose TSQL Batches
- **Leverages kernel-mode listener**





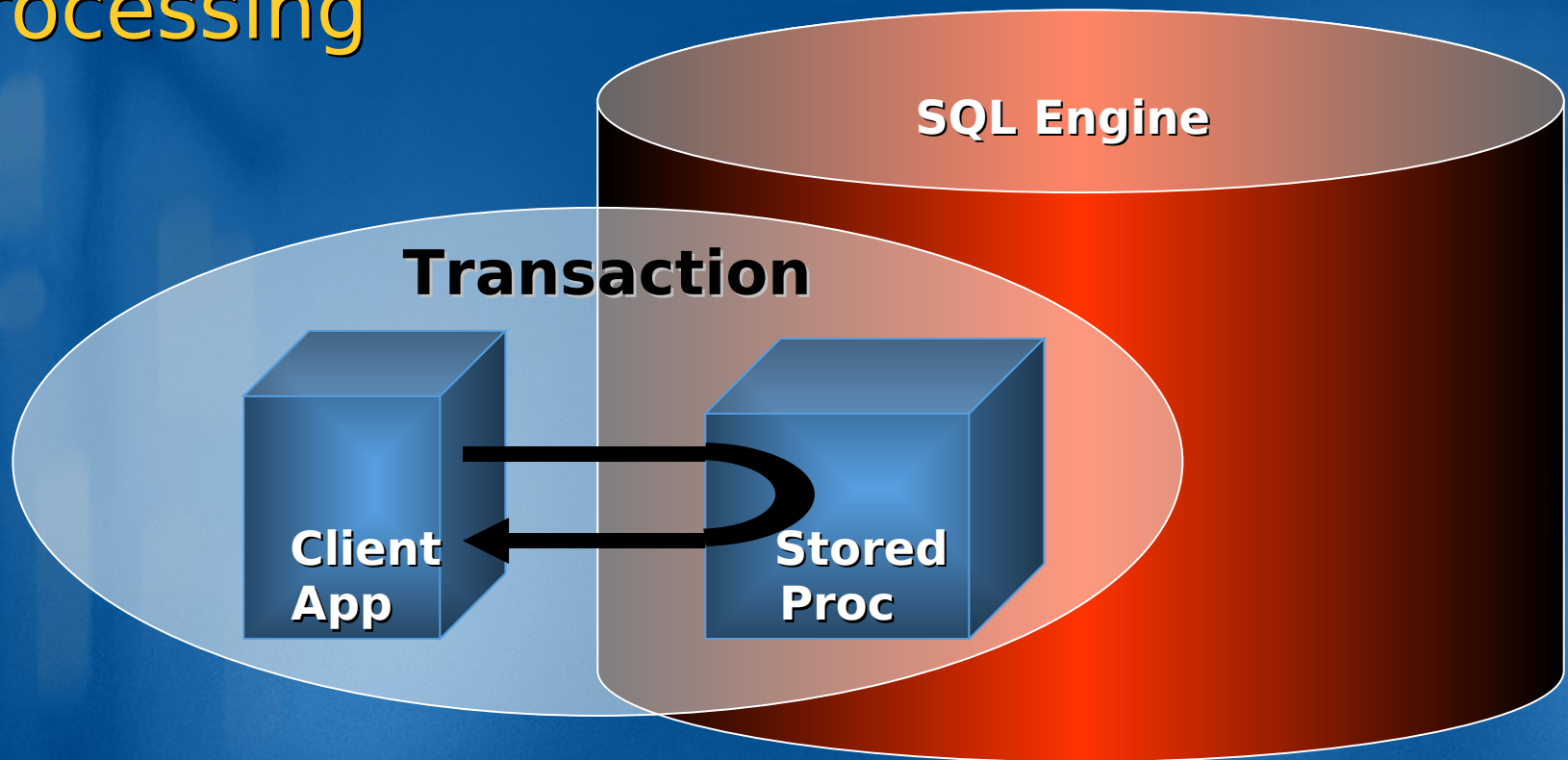
# Service Broker

- **Asynchronous, Distributed, Decoupled programming environment**
  - Fully integrated into the database engine
  - Programming Model - DDL and DML
  - Integrated Management and Deployment
- **Dependent SQL Server 2005 features - Events, Query Notifications, SQLiMail**

Microsoft  
SQL Server 2005

● **Customer Usage, benefits:**

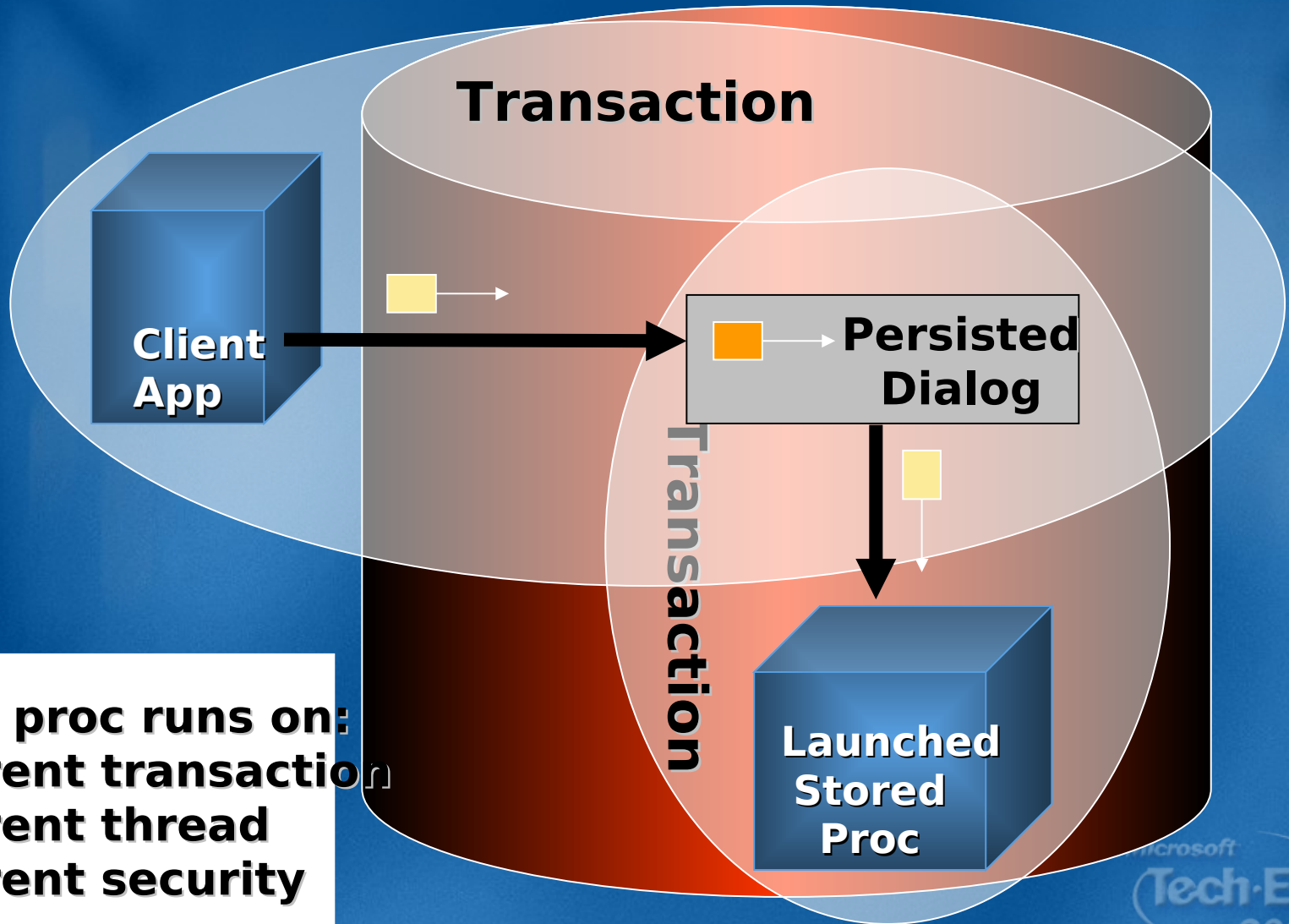
# Synchronous & Asynchronous Processing



**Both the client & stored procedure run in:**

- **Same Transaction**
- **Same Security Context**
- **Same Thread of Execution**

# Synchronous & Asynchronous Processing

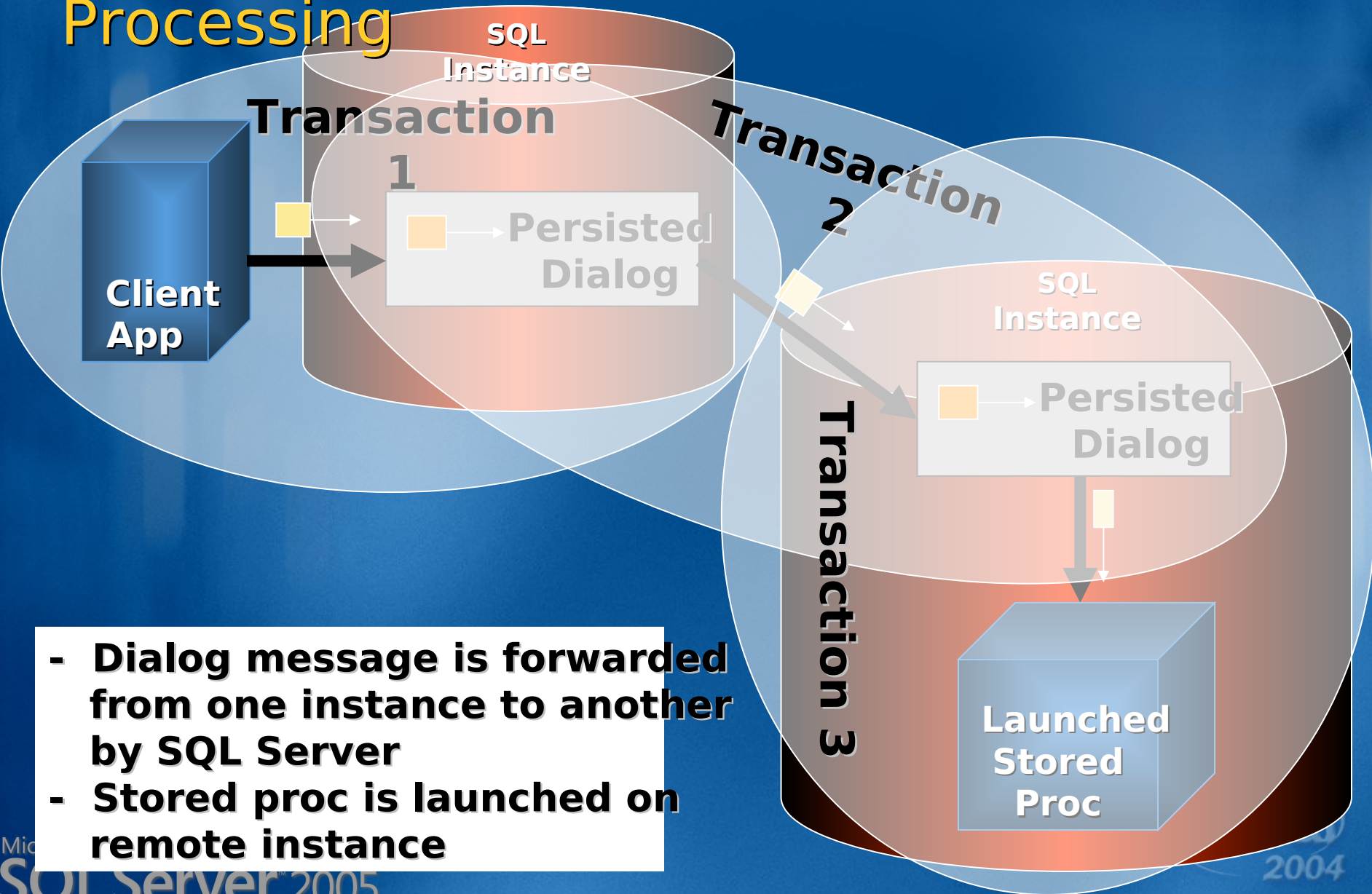


**Stored proc runs on:**

- **Different transaction**
- **Different thread**
- **Different security**



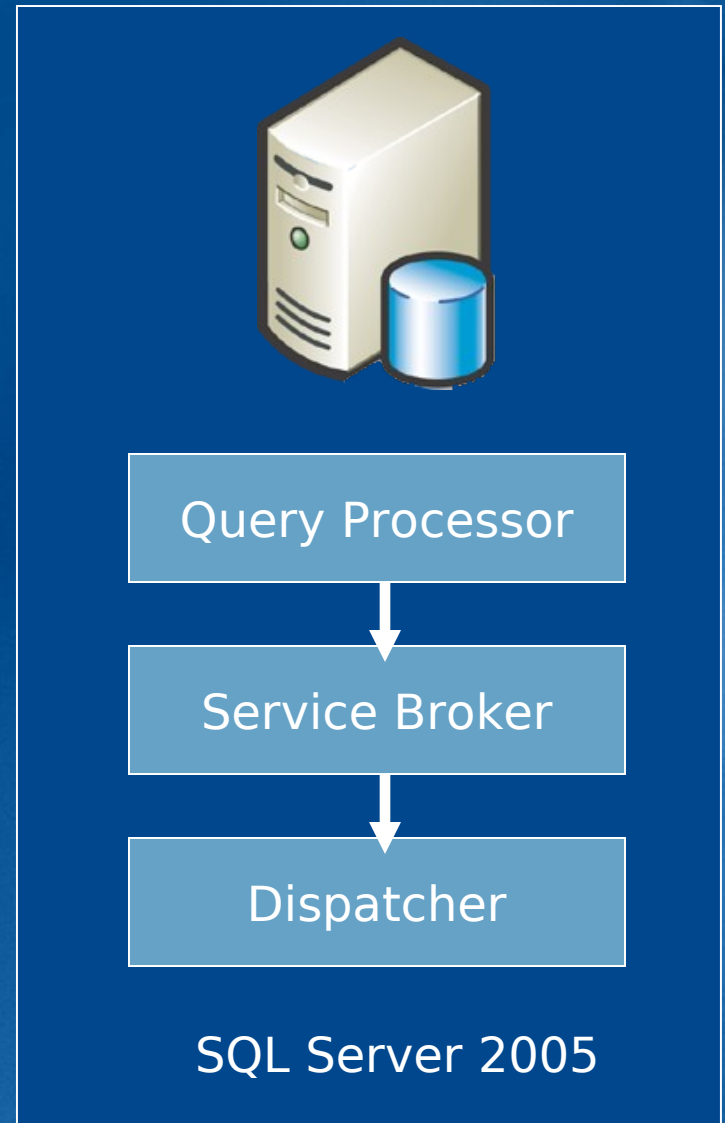
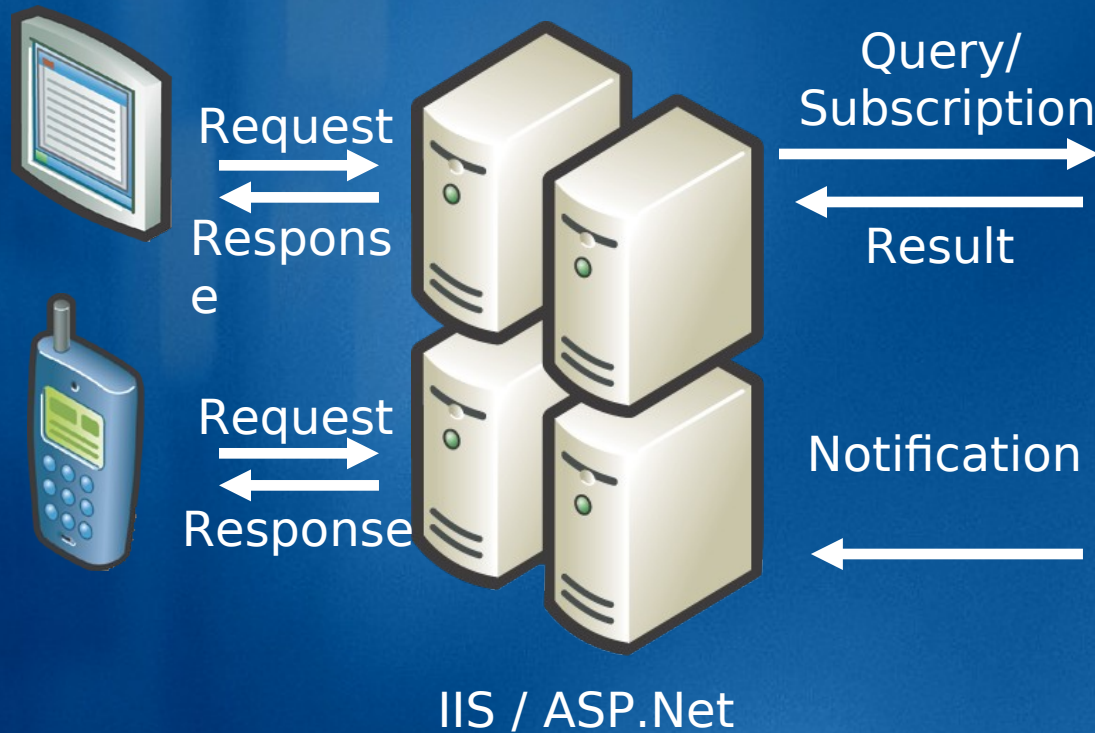
# Synchronous & Asynchronous Processing



# Query Notifications

- Ability to subscribe to *results* of a SQL query
- Integrated change detection notifies client as soon as results of query changed
- Effectively off-loading query workload from the server to caching clients

# Business Scenario - Web Caching





# demo

## Developer Enhancements

**Tom Rizzo**  
**Director, SQL Server**  
**thomriz@microsoft.com**

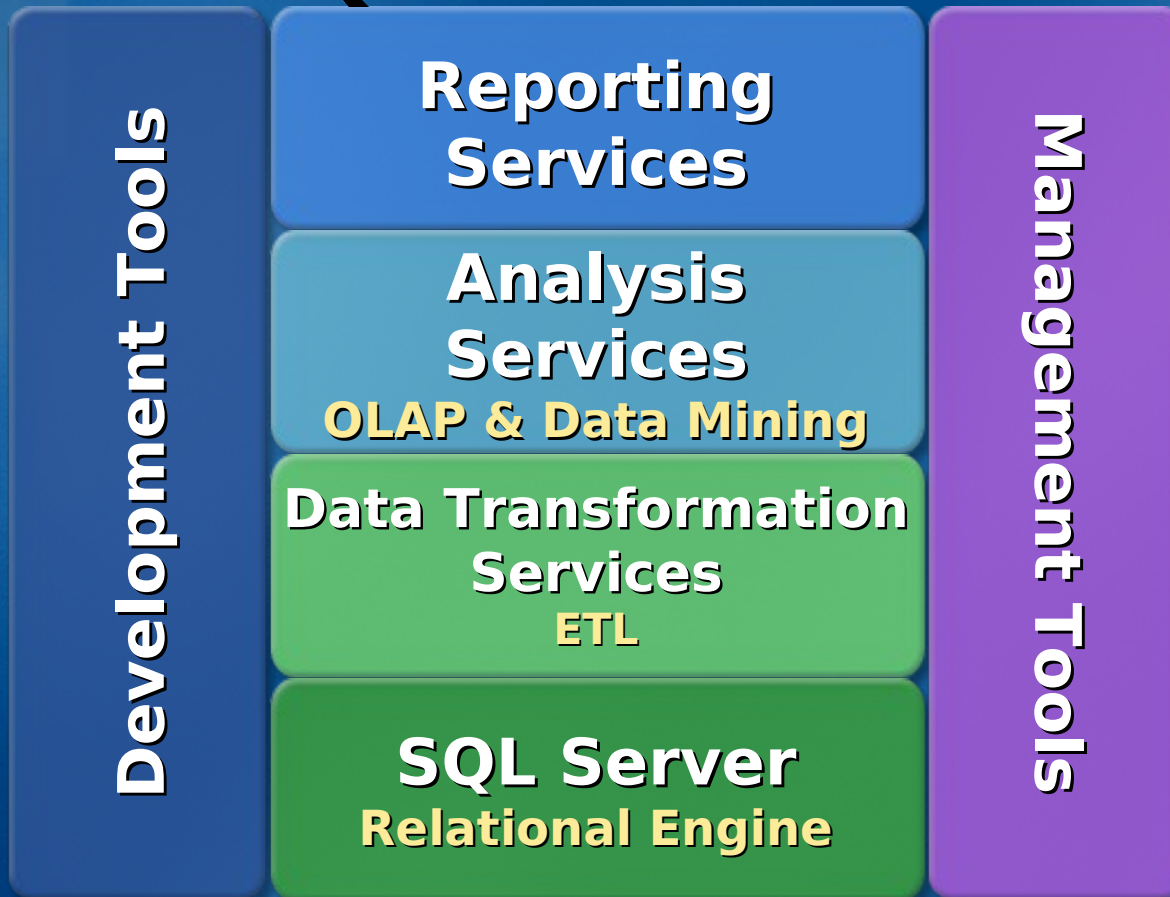
# SQL 2005 Business Intelligence

**Bill Baker**  
**GM, SQL Server Business Intelligence**

**[billbak@microsoft.com](mailto:billbak@microsoft.com)**

# SQL Server 2005 Business Intelligence

Microsoft®  
**SQL Server™ 2005**

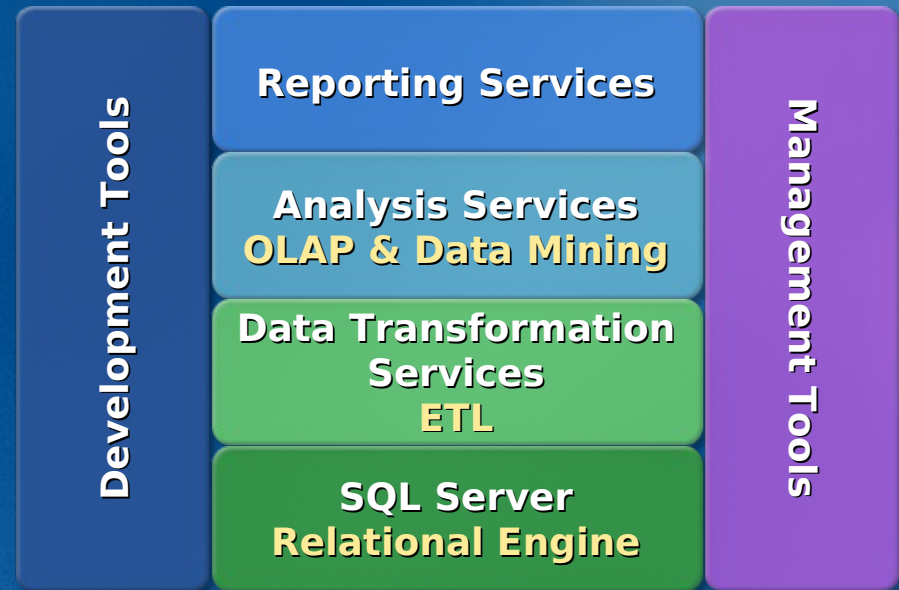




# SQL Server 2005 Business Intelligence

- Partitioning Support
- Online operations
- Snapshot isolation
- Insert and load improvements
- T-SQL enhancements
- Native XML
- .NET Framework

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**SQL Server™ 2005**



# SQL Server 2005 Business Intelligence

- Major investment
- New ETL pipeline
  - Complex data routing
  - Scale and performance
- DW & BI Savvy
  - Rich transformations
  - Integration with Analysis Services
- Enhanced designer and

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**SQL Server™ 2005**



# SQL Server 2005 Business Intelligence

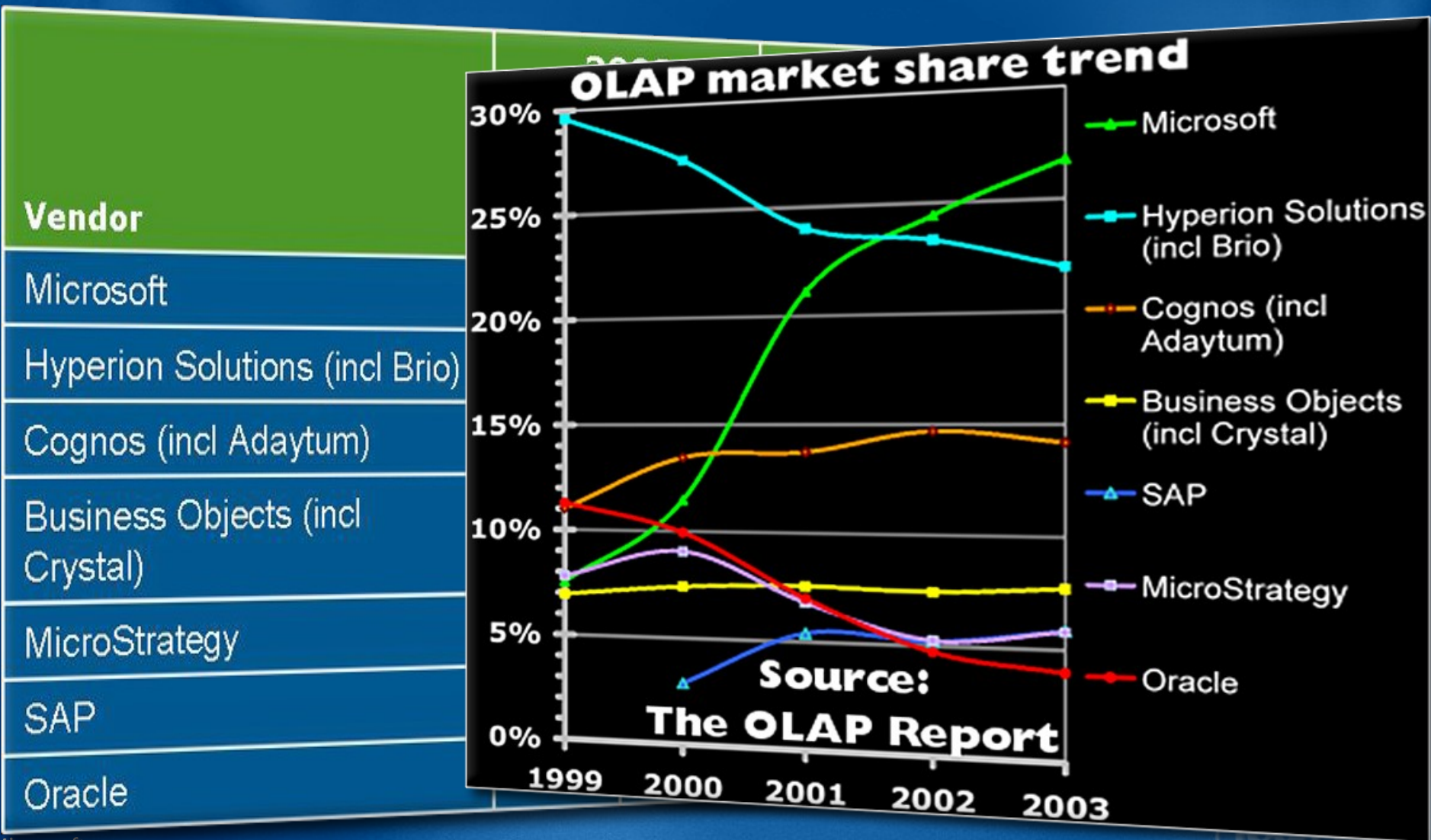
- **Unified Dimensional Model**
  - Integrating relational and OLAP views
- **Pro-active caching**
  - Bringing the best of MOLAP to ROLAP
- **Advanced Business Intelligence**
  - KPIs, MDX scripts, translations, currency...
- **Data Mining**
  - Smart applications
- **Web services**

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**SQL Server™ 2005**





# OLAP Leadership



# SQL Server 2005 Business Intelligence

- Traditional and interactive reports
- Scalable, manageable and embeddable server infrastructure
- Integration with SharePoint Portal Server, Office, browser and other familiar tools
- Support for relational, OLAP, XML and other data

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# Reporting Services Momentum

- **Amazing Launch Event**
  - Over 4,500 viewed the webcast live
  - Over 9,500 have registered and viewed the on-demand webcast
- **Over 80,000 downloaded since January**
- **Over 14 partners immediately offering complementary solutions**
- **Customers deploying and getting business value today with Reporting Services:**
  - Menlo Worldwide, PREMIER Bankcard, Inc., Cox Communications, Coldwater Creek



# ActiveViews

Microsoft  
SQL Server™ 2000  
Reporting Services  
*ActiveViews*

## The Company

- Privately held
- 5 year-old company based out of Provo, UT

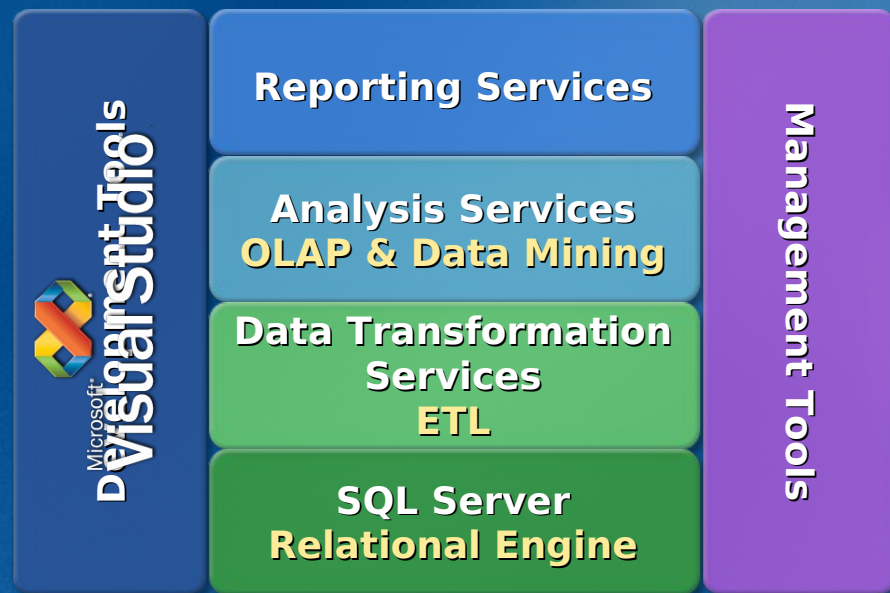
## The Technology

- Ad hoc reporting for end users
  - No knowledge of data structures required
  - Metadata-driven filtering and sorting
  - Infinite drill-through capability
- Self-service report creation
- Report modification for report consumers
- Business modeling over schema for power users and analysts

# SQL Server 2005 Business Intelligence

- A complete, integrated environment
  - DTS, Relational, OLAP, Data Mining, Reports, KPIs, code, web pages, ...
- Supports the entire life cycle
  - Prototyping, development, test, deployment, modification
- Supports enterprise development
  - Teams, source control,

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# “Smart Applications”

- Non-traditional use of Business Intelligence
- For example: Data validation

The image displays two overlapping screenshots of a web application form titled "New Customer Entry".

**Left Screenshot:** The form contains the following fields and values:

- Viewer: --new--
- Gender: Male (dropdown menu)
- Age: 25
- Education Years: 25
- Occupation: Farm
- Relation to HOH: Male Head of House

Buttons: "Reset" and "Submit".

**Right Screenshot:** This screenshot shows the same form, but with a warning message at the bottom: "Suspicious data entry in the Education field. Modify values or hit Accept to continue." The "Education Years" field now has a dropdown arrow, and the "Occupation" and "Relation to HOH" fields also have dropdown arrows. A new "Accept" button has appeared next to the "Reset" button.



# Segmentation

- Matching individuals to populations
  - Drive a marketing campaign
  - Understand different customer profiles to fine-tune a product or service
- Or... does this data make sense?



# demo

## BI Enhancements

**Tom Rizzo**

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# Manageability Goals

- **Integrated Management, Rich UI**
- **Scale down time/effort for common management tasks**
- **Everything scriptable**



# Manageability - Tools

- **New: SQL Server Management Studio**
  - New Rich GUI
  - Integrated Authoring, Management
  - Support all SQL Server components
- **New: Management Objects (SMO)**
  - Managed code, new design patterns
  - Improved Scalability, Scripting
- **New: SQLCMD**
  - High Performance CMDLine
- **New: SQLMail Replacement**
  - SMTP Support, Cluster Support, No Outlook required

# Manageability - Tuning

- **Database Tuning Advisor**
  - **Time Bound Tuning**
  - **What-If Analysis**
  - **Scalability**
- **XML Show Plan**
  - **Publicly available Schema**
  - **Programmatic Access**
  - **Portability**

# demo

## Manageability Enhancements

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**Director, SQL Server**  
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# Conclusion

**SQL Server 2005 delivers an  
Integrated Data Platform:**

- **End to end lifecycle management of huge data volumes:**
  - From ETL through archive
  - Provides business value for all data sources
  - Many availability enhancements
- **Extensions & Semi-Structured Data**
  - CLR & XML
- **Scale out services:**
  - Service Broker, Web Services, Query Notifications
- **... and much, much, more...**

# ***Next Steps: SQL Server 2005***

## **Exclusive Tech•Ed Offer!**

Receive **Beta 2** of **SQL Server 2005**

Register for SQL Server 2005 Beta 2 at: [http://  
www.msteched.com/SqlBetaBits.aspx](http://www.msteched.com/SqlBetaBits.aspx)

- **Visit the SQL Server 2005 website:**  
[www.microsoft.com/sql/2005](http://www.microsoft.com/sql/2005)
- **Learn more about SQL Server 2005 at Tech•Ed**
  - **Hands On Labs**
    - Rooms 6E and 6F
    - 13 Hands On Labs
  - **Ask the Experts**
    - Track Cabanas located around CommNet
    - Experts Available All Week

# ***SQL Server 2005: More Sessions***

<b>DAT330</b>	<b>Tue 3.30 - 4.45</b>	<b>SQL Server 2005 (code named "Yukon"): Security Enhancements</b>
<b>DAT329</b>	<b>Tue 5.00 - 6.15</b>	<b>SQL Server 2005 (code named "Yukon"): A Platform for Web Services</b>
<b>DAT313</b>	<b>Wed 8.30 - 9.45</b>	<b>Introducing SQL Server 2005 (code named "Yukon") Data Transformation Services</b>
<b>DAT377</b>	<b>Wed 10.15 - 11.45</b>	<b>Data mining in SQL Server 2000 and SQL Server 2005 (code named "Yukon")</b>
<b>DAT317</b>	<b>Wed 2.00 - 3.15</b>	<b>SQL Server 2005 (code named "Yukon"): Setup and Deployment</b>
<b>DAT318</b>	<b>Wed 3.45 - 5.00</b>	<b>SQL Server 2005 (code named "Yukon"): .NET Framework-Based Programming in the Database</b>
<b>DAT323</b>	<b>Wed 5.30 - 6.45</b>	<b>SQL Server 2005 (code named "Yukon"): What's New in Replication</b>
<b>DAT328</b>	<b>Thu 8.30 - 9.45</b>	<b>SQL Server 2005 (code named "Yukon"): Introduction to the Unified Dimensional Model in Analysis Services</b>
<b>DATC15</b>	<b>Thu 10.15 - 11.30</b>	<b>Real Time Analytics: Bringing It All Together Using Analysis Services</b>
<b>DAT321</b>	<b>Thu 10.15 - 11.30</b>	<b>SQL Server 2005 (code named "Yukon"): Management Tools</b>
<b>DAT319</b>	<b>Thu 1.30 - 2.45</b>	<b>XML in the Database - the XML Data Type in SQL Server 2005 (code named "Yukon")</b>
<b>DAT340</b>	<b>Thu 3.15 - 4.30</b>	<b>Applying and Targeting DTS in SQL Server 2005 (Code Named "Yukon")</b>
<b>DAT324</b>	<b>Thu 5.00 - 6.15</b>	<b>SQL Server 2005 (code named "Yukon"): Backup and Restore Engine</b>
<b>DAT322</b>	<b>Fri 9.00 - 10.15</b>	<b>SQL Server 2005 (code named "Yukon"): SQL Server Management Object (SMO), Next Generation SQL-DMO</b>
	<b>Fri 10.45 -</b>	<b>High Availability Technologies in SQL Server 2000 and SQL Server 2005</b>



# Community Resources

## SQL Server Community sites

<http://www.microsoft.com/sql/community/default.mspx>

## List of newsgroups

<http://www.microsoft.com/sql/community/newsgroups/default.mspx>

## Locate Local User Groups

<http://www.microsoft.com/communities/usergroups/default.mspx>

## Attend a free chat or web cast

<http://www.microsoft.com/communities/chats/default.mspx>

<http://www.microsoft.com/usa/webcasts/default.asp>

# Session Evaluation

Please fill out a session evaluation on CommNet

**Q1: Overall satisfaction with the session**

**Q2: Usefulness of the information**

**Q3: Presenter's knowledge of the subject**

**Q4: Presenter's presentation skills**

**Q5: Effectiveness of the presentation**

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